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# Workshop on Fukushima Data Compilation (U)

N. G. Wimer

March 27, 2012

MARC IX

Keauhou, HI, United States

March 26, 2012 through March 30, 2012

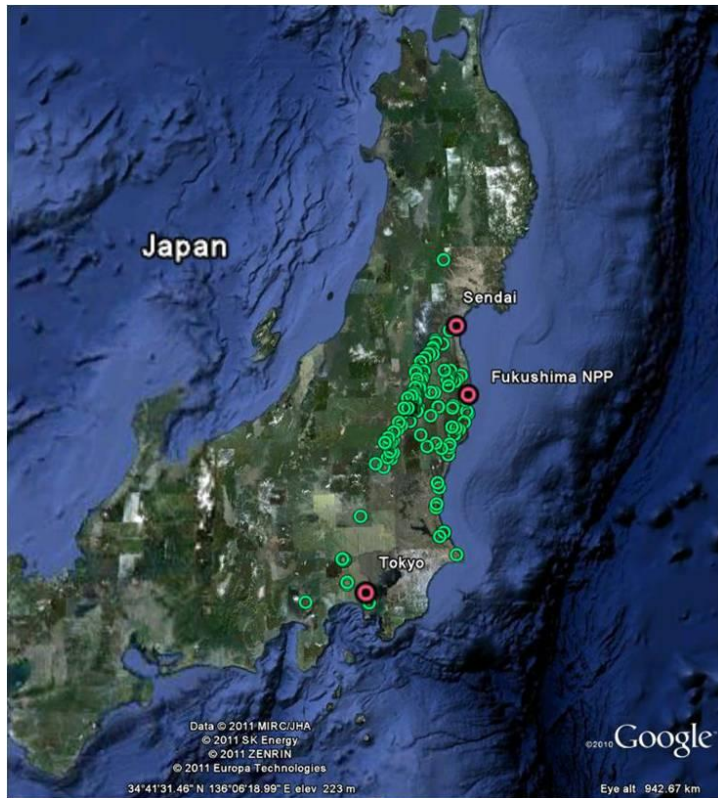
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# Workshop on Fukushima – Data Resource Discussion

## MARC IX Conference – 26 March 2012



### DOE Radiological Assessment Responders:

Lawrence Livermore National Laboratory

Los Alamos National Laboratory

Sandia National Laboratory

Presenter: N. Wimer (LLNL)

Online Resource: [www.data.gov](http://www.data.gov)

- Search '2011 Fukushima Incident'

### Outline

1) Data Resource Compilation

2) Data Resource Example:

**#3: U.S. DOE Field *In Situ* HPGe Assays**

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## Aerial Measurements – Gamma Spectroscopy Surveys



*Courtesy AMS*

## Field *In Situ* Assays – Gamma Spec & Exposure Rate

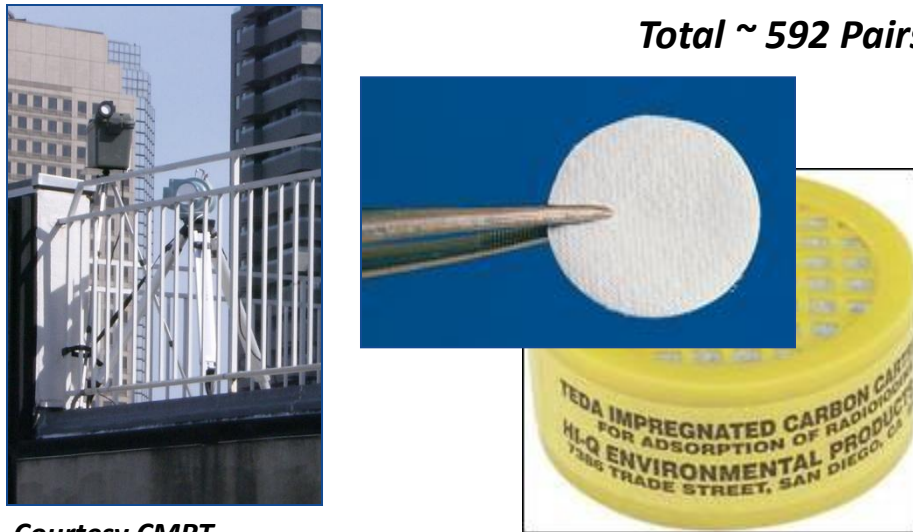
*Total ~ 250+ Spectra*



*Courtesy CMRT*

## Air Filters – Paper & Charcoal Gamma Spec & Lab Chemistry

*Total ~ 592 Pairs*



*Courtesy CMRT*

## Soils and Soil Cores Gamma Spec & Lab Chemistry

*Total ~ 122 Samples*



*Courtesy CMRT*

# Data Resource Compilation (1)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
1	U.S.	DOE	Aerial Survey	NE Japan	Na(I), HPGe	No	Broad Area	05/11; 10/11
	Status: Released to GOJ by DOE				Comments: 1-Year/5-Year/50-Year avoidable dose estimates			
2	U.S.	DOE	Aerial Spectra	NE Japan	Na(I), HPGe	No	10-20	03/11
	Status: Not released to GOJ or public.				Comments: Attempt to determine state of reactors, indeterminate			
3	U.S.	DOE	Field <i>In Situ</i>	NE Japan	HPGe	No	179	03/11-05/11
	Status: Released to Public by DOE				Comments: Associated DOE air filters collected for all <i>in situs</i>			



## Data Resource Compilation (2)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
4	U.S.	DOE	Low-vol Air Filter Paper	NE Japan	Gamma, Beta	No, Yes	592	03/11-05/11
	Status: Released to GOJ by DOE				Comments:			
5	U.S.	DOE	Low-vol Air Cartridge	NE Japan	Gamma	No	592	03/11-05/11
	Status: Released to GOJ by DOE				Comments:			
6	U.S.	DOE	High-vol Air Filter Paper	NE Japan	Gamma, Beta	No, Yes	6	03/11-05/11
	Status: Not released				Comments:			

## Data Resource Compilation (3)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
7	U.S.	DOE	Soil Surface Samples	NE Japan	Gamma, Beta, M/S	No, Yes	33	03/11-05/11
	Status: Not released				Comments:			
8	U.S.	DOE	Soil Cores	NE Japan	Gamma	No	6	03/11-05/11
	Status: Reporting to DOE underway				Comments: Cs soil depth profiles			
9	U.S.	DOE	GOJ Surface Soils	Across Japan	Gamma; Beta	No; Yes	89	03/11
	Status: Released to GOJ by DOE				Comments: GOJ / Prefectural soil samples in agricultural regions			

## Data Resource Compilation (4)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
10	U.S.	DOE	Surface Swipes	NE Japan	Gamma, Beta, M/S	No, Yes	4	03/11-05/11
	Status: Reporting to DOE underway				Comments: Pair of swipes @ 20 km have evidence for reactor U/Pu			
11	CTBTO	IMS	Particulate RASA Units	World-wide	Field Gamma	No	Var	03/11+
	Status:				Comments: Release required from states hosting IMS samplers.			
12	CTBTO	IMS	Gas Sample ARSA Units	World-wide	Field Beta/ Gamma	Yes	Var	03/11+
	Status:				Comments: Release required from states hosting IMS samplers.			



## Data Resource Compilation (5)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
13	UN	IAEA	Soil & core samples					
14	GOJ	MEXT	Monitoring Data	Various				
15	GOJ	MEXT	Soil Assays	Various	Gamma, beta	No, Yes	Var	To Present

## Data Resource Compilation (6)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
16	JAPAN	TEPCO	Soil, air filter, water	On NPS	Gamma, beta	No, Yes	Var	Mar 12 – Pres
	Status: Continuing PDF reporting online.				Comments: Noted certain results once posted online now removed.			
17	JAPAN	Other NPSs	Soil, air filter, water	On NPS	Gamma, beta	No, Yes	Var	Mar 12 – Pres
	Status: By prefecture, Quarterly ongoing PDF reporting online (in Japanese).				Comments:			
18	JAPAN	Industry	Various					
	Status: Standard scientific literature reporting anticipated.				Comments:			

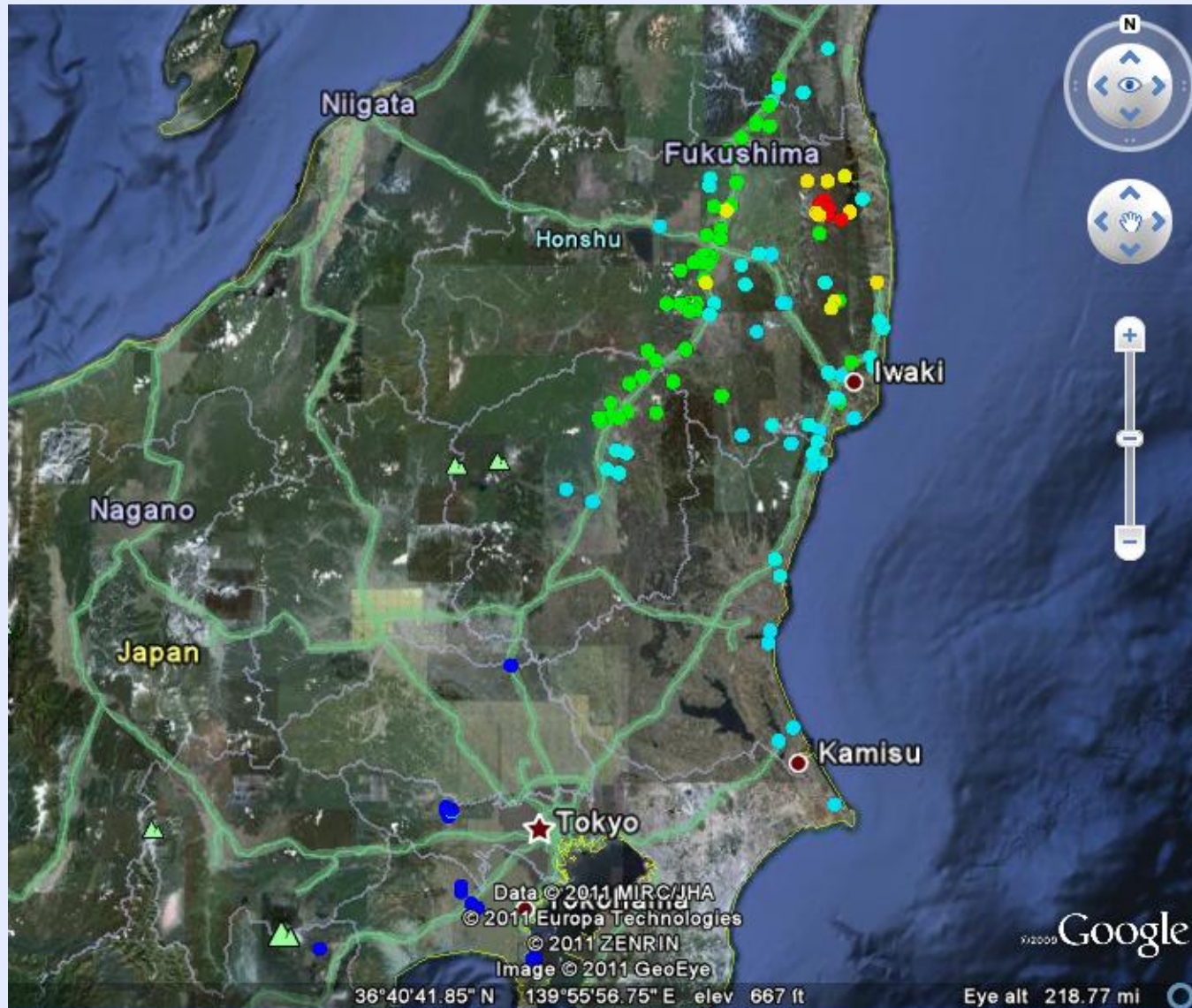
# Data Resource Compilation (7)

#	Country	Org	Coll Type	Loc	Assay Tech	RC	No.	Time-frame
19	JAPAN	Acad-emic	Various					
	Status: Standard scientific literature reporting anticipated.				Comments:			
20								
	Status:				Comments:			
21								

## Data Resource Example (#3): U.S. DOE Field *In Situ* HPGe Field Assays

- Country U.S.A.
- Organization Dept of Energy / Consequence Management
- Collection Type Field *In Situ* HPGe Assays (1-meter Tripod)
- Location Across Northeastern & Central Japan
- Assay Technique HPGe direct deposition assay
- Radchem No
- No. of Assays 179 individual assays
- Timeframe 17 March – 12 May 2011
- Status Released to Public (DOE)
- Comments Associated air filters collected for nearly all

# U.S. DOE Consequence Management Field *In Situ* HPGe Assays (179 Total, 3-5/2011)



Cs-137 uCi/m<sup>2</sup>

5-100	●
2.5-5.0	●
1.3-2.5	●
0.4-1.3	●
0.0-0.4	●

Note:  
Deposition activity quoted  
at time of assay.

*Graphic courtesy of  
CM Home Team*

# Field *In situ* HPGe assay radionuclide composition gradually shifted over time (11 nuclides reported in $\mu\text{Ci}/\text{m}^2$ )

## *In Situ* HPGe Spectrum on 18 Mar 11

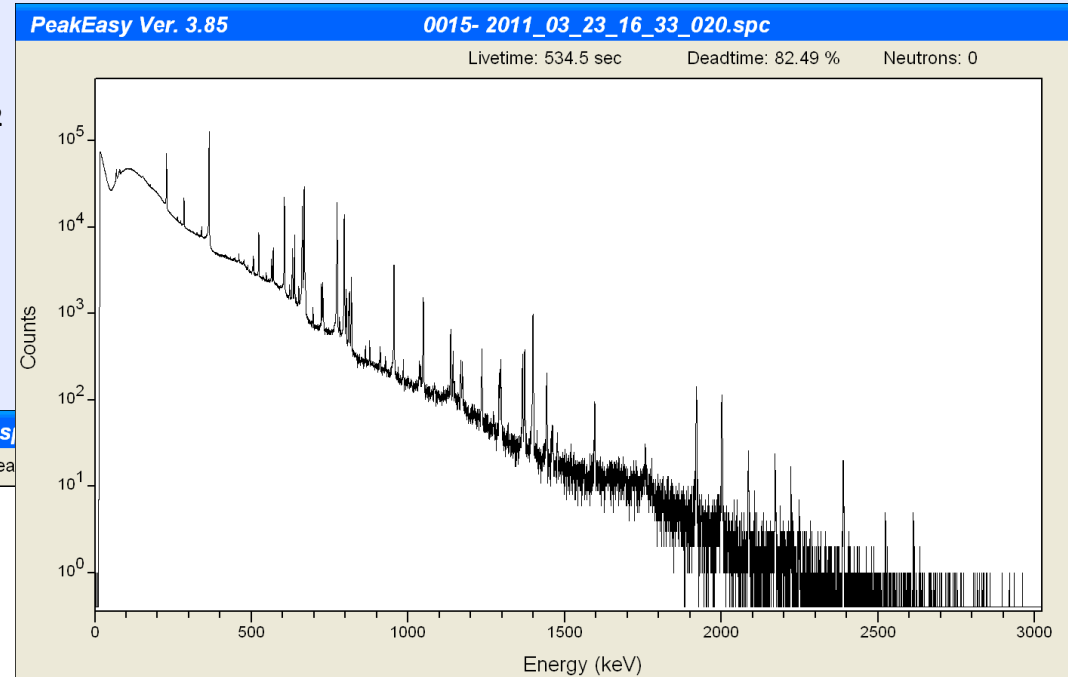
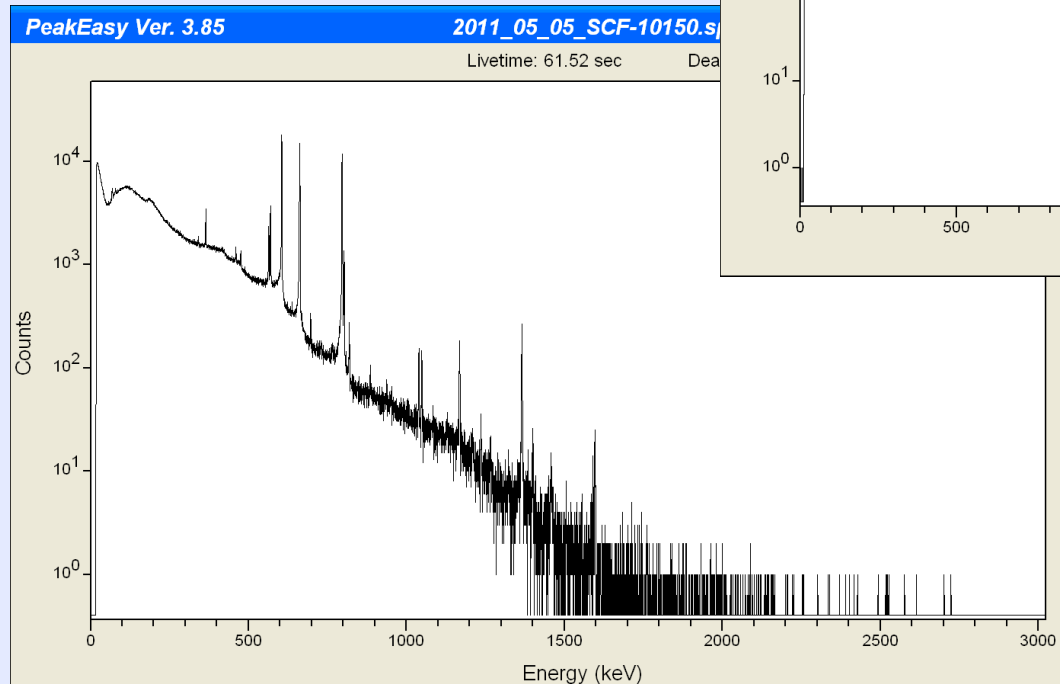
Dist = 8 km South of NPP

Ground + Airshine = Cs-137 at  $13 \mu\text{Ci}/\text{m}^2$

### Observed Nuclides:

I-131, I-132, I-133, Te-129m, Te-132,

Cs-134, Cs-136, Cs-137, La-140



## *In Situ* HPGe Spectrum on 5 May 11

Dist = 20 km NW of NPP

Groundshine = Cs-137 at  $100 \mu\text{Ci}/\text{m}^2$

### Changes in Nuclides:

Absent = I-132, I-133, Te-132

Now Evident = Ag-110m, Nb-95



## Data Resource Example (#3):

U.S. DOE *In Situ* HPGe Field Assays – Data Reporting Format

- Record Serial #
- Sample #
- Location/Team
- Latitude
- Longitude
- Spectrum Start Date (JST)
- Spectrum Start Time (JST)
- Decimal Date/Time (JST)
- Detector Serial #
- Spectrum Filename Assessed
- Radionuclide Assay  
“Apparent Ground Deposition  
at the time of assay”
- Nuclide Assay (uCi/m<sup>2</sup>)
- Nuclide Uncertainty (% 1-sigma)

• I-131	Cs-136
• I-132	Cs-137
• I-133	La-140
• Te-129m	Ag-110m
• Te-132	Nb-95
• Cs-134	

## Data Resource Example (#3):

U.S. DOE *In Situ* HPGe Field Assays – XLS File Screenshot

Final #	Sample #	Location/Team	Lat	Long	Spectrum Start Date (JST)	Spectrum Start Time (JST)	Decimal Date/Time (JST)	DET Serial Number
0001	SCF-10007	CMOC Building 1503 []	35.741064	139.360932	17-Mar	16:58	40619.707	4639

RADIONUCLIDE "APPARENT GROUND DEPOSITION" AT THE TIME OF ASSAY (MICRO-CURIES PER SQUARE METER)											
I131 uCi/m2	I131 Err%	I132 uCi/m2	I132 Err%	I133 uCi/m2	I133 Err%	Te129m uCi/m2	Te129m Err%	Te132 uCi/m2	Te132 Err%	Cs134 uCi/m2	Cs134 Err%
5.33E-02	11.7	9.90E-03	31.0	----	----	----	----	9.71E-03	18.9	----	----

Cs136 uCi/m2	Cs136 Err%	Cs137 uCi/m2	Cs137 Err%	La140 uCi/m2	La140 Err%	Ag110m uCi/m2	Ag110m Err%	Nb95 uCi/m2	Nb95 Err%
4.18E-03	28.4	----	----	----	----	----	----	----	----

Necessary details include:

- Assay Units (Activity, Concentration, Specific Activity)
- Uncertainty Treatment (Systematic, Statistical, # of Sigmas)
- Nuclide Decay Treatment (Refer to Collection Time, Assay Time)